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The Action of Nicotine on the Adrenal Gland.

The physiological actions of adrenal gland hormones are observed in most tissues and are vital for the normal functioning of many organs. The effects of medullary catecholamine release, for example, include hyperglycemia, hyperlipemia, peripheral vasoconstriction, and an increase in the work of the heart. Enhanced corticosteroid release produces marked changes in water and electrolyte balance and in carbohydrate, fat, and protein metabolism. Thus, any agent which can affect the production and release of adrenal hormones may have marked effects on bodily functions. Nicotine is an agent which can enhance both catecholamine and corticosteroid release from human and animal adrenal glands, so that basic knowledge of the effects of nicotine on adrenal activity is of considerable importance in order to help elucidate hormone secretory mechanisms. Moreover, such information may allow a better assessment of the effects of tobacco smoking on the adrenal cortex and medulla.

The prime thrust of this investigation will be to systematically study the effects of nicotine on both catecholamine and corticosteroid release from the cat adrenal gland perfused in situ, in order to elucidate the mechanisms by which it enhances adrenal activity. Not only will hormone production and release be assayed under various experimental conditions, but other cellular processes, which are presumed to be related to the physiological response will also be investigated, as for example, the possible relationship of adrenal cyclic AMP levels and radiocalcium fluxes to hormone release.

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